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NOTES ON THE SEAL AND WHALE FISHERY OF 1884.

BY THOMAS SOUTHWELL, F.Z.S.

THE season of 1884 must be considered as a very unfavourable one for the Newfoundland sealing. It is probable that a larger number of young seals escaped this season than usual, and that the smallness of the catch is to a considerable extent due to the fact that the old seals took to the ice high up in the neighbourhood of Funk Island, where the pack was very heavy, rendering it impossible for the ships to approach them: later in the season they came farther south, and some of the vessels made good catches; but the general result was very partial and unequal. I fear, however, that even in this favoured locality the symptoms of exhaustion, which cannot fail speedily to result, are already making themselves apparent.

Of the twenty-one British vessels which left St. John's Harbour on March 10th, one missed the seals altogether, the remaining twenty ships killed 192,175 seals (against 286,000 last season); of these the great bulk fell to six vessels (the 'Neptune,' 41,000; 'Aurora,' 28,000; 'Ranger,' 24,000; 'Falcon,' 21,000; 'Hector,' 19,000; and 'Greenland,' 16,000); all the remainder had to be counted with much smaller numbers, the 'Arctic' only killing 100 seals. The average for the twenty vessels was 9608 each, against an average of about 14,000 for the season of 1883. If, however, we take the six Dundee vessels alone, and omit the 'Aurora,' which killed more thousands than any of the others did hundreds, and which therefore would render

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the average delusive, the remaining five vessels would only show an average of 1235 seals, a result which must have entailed a very considerable loss on this portion of the voyage. The 'Resolute,' which killed only 495 seals in Newfoundland, afterwards went to Greenland, and shot 4227 old seals and three Bottle-nose Whales, which would help to make up her deficiency. One vessel, the 'Tiger,' was lost in the ice, but the crew were saved. Hitherto the practice has been to kill the young seals as soon after March 10th as they could be reached, and to continue the fishery until the end of May, thus enabling such vessels as succeeded in filling up early to discharge their cargoes at St. John's and make a second trip to the ice; this year, however, the owners voluntarily agreed to close the fishing on April 25th, consequently only five of the vessels had an opportunity of making a second trip; of these one was unsuccessful, and the remaining four killed only 4400 seals. There can be no doubt the owners exercised a very wise discretion in thus restricting the period of fishing, for, unless the seals are to be exterminated, the time allowed for taking them must be curtailed, and under no circumstances should a vessel which had once filled up be permitted to make a second trip to the ice. Unless some such means are adopted for ensuring the escape of some of the young brood, the Newfoundland seal fishery, like that of Greenland, must inevitably before many years are past be practically ruined.

For the particulars of the Greenland sealing I am again indebted to the kindness of my friend Capt. David Gray, a most interesting journal of whose voyage, kept by his eldest son who accompanied the 'Eclipse,' I was allowed to see. The 'Eclipse' left Peterhead on February 28th, and stopping at Lerwick to make up her complement of men (fifty-four) she made the first ice on March 17th in lat. $72^{\circ} 23' N.$, long. $5^{\circ} 40' W.$, and saw a few Greenland and Hooded Seals next day. A few Hooded Seals with young ones were seen on the 23rd and on the 28th. Mr. Gray writes:—"There are thirty-two sail in the Greenland seas all endeavouring to get amongst the seals before the close time expires; twenty-five of these are steamers more or less powerful and having each a great advantage over the sailing vessels, and the one over the other according to their steaming-power. Thus, as was seen to-day, the most powerful ships were farthest

in through the ice, steaming about in search of the seals, the sailing ships having to remain near the sea-edge, able only to watch the movements of the steamers. Half-way between, a few of the weaker class of steamers were working about, their only chance being to get into the wake of a stronger vessel and follow." Whilst thus cruising in the ice the motions of both seals and birds are closely watched, large numbers of gulls always frequenting the ice where the seals are breeding; the direction taken by every seal which is met with is closely watched, and if possible cross-bearings obtained from the different points, the better to indicate the position of the main body of the seals. On April 4th, after great exertions had been made to work through the ice, the breeding pack was discovered in lat. $73^{\circ} 43' N.$, long. $3^{\circ} 52' E.$, covering a space of about eight miles in extent from east to west, and about a mile and a half broad; five Scotch vessels were present and six Norwegians. The 'Eclipse' managed to get within about four miles of the seals, and at 1 o'clock a.m. forty-eight men were sent on to the ice to kill and "bing" the young seals. This went on till the united crews of the ships present had killed off and "binged" the whole brood, which was accomplished at about noon on April 7th. The "binging" was performed as follows:—As soon as the seals were reached the officer in charge planted a flag in a prominent piece of ice, and immediately the crew commenced to kill and flense and drag the skins towards it, until the ice was cleared within a radius of about two hundred yards; a "bing" was then completed and another flag planted farther on, and the work carried on as before, until the whole of the young seals were killed. Dragging the skins to the ship is an after-process, and is deferred till there are no more seals to kill; then comes the "making off" with the blubber, and the salting and stowing away of the skins. As no other breeding seals were met with, it may be fairly presumed that all the young brood perished.

The result of the Greenland sealing, so far as the twelve British ships are concerned (of the sixteen Norwegians and two Swedes I have no return, but the young sealing alone is estimated to have yielded 75,000 seals to the united fleets, about 26,000 of which fell to the share of the British vessels), was more satisfactory than that of Newfoundland, resulting in a total of 39,700 old and young seals, being an average of 3308 against a

total of 37,922, and an average of 2917, for the season of 1883. Capt. David Gray, of the 'Eclipse,' killed 7200, nearly the whole of which were young seals, as he did not take part in the old seal shooting later on; his brother, Capt. John Gray, of the 'Hope,' killed 6100 young seals, and in the month of May also shot 1200 old Hooded Seals; the remaining vessels secured smaller numbers, the lowest being forty-six seals only. It will thus be seen that the vessels which went to the Greenland sealing made a better average (admitting the one exception named) this season than did the Dundee vessels which went to the Newfoundland fishery. The value of the 1069 tons of seal-oil brought home by the Scotch vessels from both Newfoundland and Greenland last season, at £23 per ton, represents a sum of £24,587; and that of the 74,189 skins, which may be taken at 7s. each, a further sum of £25,966.

I have already said that the success of the St. John's vessels was very unequal, and that the average was helped up by some few of the vessels which were fortunate enough to get amongst the seals; but, assuming that it requires 15,000 seals to pay the very heavy expenses of one of these powerful steamers, there were only six out of a fleet of twenty-one which brought any return. Most of the others incurred a very heavy loss; the twelve Greenland sealers made an average of 3308, and the results were more evenly distributed; but with the present reduced value of produce in many cases the voyage must have proved a failure. It is not surprising, therefore, to find that the Newfoundland sealers closed the fishery earlier than usual, and that thoughtful men like Capt. D. Gray should plead for an extension of the Greenland close-time. As I said before, it is probable that a large number of the young seals which were produced on the Newfoundland ice this season escaped; this, however, was a mere accident, and rarely happens; but in Greenland it is not likely that any of the brood for several years past (with the exception of the season of 1882) have escaped. Although the close-time which came into operation in 1877 has somewhat retarded the extermination of the Greenland seals, it is evident that something else is required; and Capt. Gray, in a circular letter which he has issued to those interested, advocates an extension of the close-time to April 10th, and that the Hooded Seals should not be shot after some day early in July, after

which they are out of condition and valueless. This doubtless would have a very beneficial effect, but I venture to think that more is required.

I explained in a previous page the way in which the ships bore through the ice, each one more anxious than the other to obtain a good position near the breeding pack in readiness for the morning of April 3rd, when it becomes legal to kill the seals; some of these ships are in the neighbourhood of the pack for days before the opening of the fishery, and their presence there must of necessity have a disturbing influence on the mother seals, which is prejudicial to them in many ways, such as causing them to deposit their young in unsuitable situations, or even in the water, where they would be drowned. It seems, therefore, desirable that some restriction should be placed upon the sailing of the vessels (as at St. John's), in order to ensure their not reaching the ice too early. I am aware that the circumstances of the voyage to the Greenland sealing differ greatly from those of the St. John's vessels, and that in the one case they are close upon the sealing ground, whilst in the other 800 miles of stormy sea have to be passed over at an inclement season of the year, which may require five days or three weeks to accomplish, according to the state of the weather; also that winds which would suit the British vessels would be unsuitable to the Norwegians; then again, the difference between steam and sailing vessels would have to be allowed for, so that the difficulties in the way of this scheme seem to be altogether insuperable. Would it not be possible, however, to appoint a rendezvous nearer at hand from which the ships might depart simultaneously, as is the case from St. John's? I can only suggest Jan Mayen.

Capt. Gray's suggestion that a date should be fixed, after which it should be illegal to shoot the Hooded Seals, is an excellent one, and should be enforced; and this would entail no hardship, as the old Hooded Seals are all but valueless by the end of June. With regard to the Newfoundland fishery, it seems desirable that the second trip should not be allowed; a vessel having once filled up and secured a paying cargo should not be allowed to return to the ice. I make these remarks with great diffidence, feeling sure that the practical good sense of the sealers themselves, which has already shown itself in the wholesome restrictions, so far as they go, which are at present in existence,

will also dictate what further changes are desirable in their own interest if means are devised for carrying them into effect.

The Davis Straits whaling, which in the past season has been confined to the Dundee vessels, has been much more successful, if, owing to the very reduced value of the produce, not much more remunerative than that of 1883. Nine vessels visited the straits and returned with seventy-nine whales, the 'Arctic' heading the list with thirteen "fish"; these are estimated to yield 755 tons of oil and 39 tons of bone. Of the Peterhead vessels three visited the Greenland fishery, the 'Eclipse' capturing seven fine whales, the 'Erik' three (and fourteen Bottle-noses), and the 'Hope' only one; these produced 157 tons of oil and 7 tons 12 cwt. of bone. The joint produce of the twelve vessels was ninety whales, yielding 912 tons of oil and $46\frac{1}{2}$ tons of bone ($6\frac{1}{2}$ tons of which would probably be under six feet long, and therefore worth only half price); at an estimate of £26 per ton for the oil and £1500 per ton for the size-bone would represent a sum of £88,587; but I am informed that Arctic produce is at present all but unsaleable. The whales proved fairly numerous, but were very shy and difficult of approach.

No White Whales were killed this year by the Davis Straits whalers, but, as Capt. Adams, late of the 'Arctic,' has been so kind as to give me some interesting particulars of the mode of proceeding in this fishery, I append them in his own words:—"The White Whale is very shy and easily scared, quick in its movements, and very keen-sighted; it is consequently very difficult to capture in deep water. It is generally taken in the shallow bays after the ice breaks away from the land. The Grampus is a great enemy to the White Whale, and great numbers of the latter are often driven by them into the shallows. The fishermen are on the watch for such a chance, and when it occurs all boats are sent in pursuit; they are placed in a cordon round the school of fish, the boats being about equal distance apart and to the seaward of the fish; the boats gradually advance, driving the fish on shore at the most convenient place they can. When the tide recedes the White Whales are left aground or nearly so, and then the slaughter commences, the men jumping into the shallow water and despatching the fish with lances. Sometimes the fish turn and make a desperate rush seaward, great numbers escaping. Nets have occasionally

been used in endeavouring to enclose the fish, but I cannot say that on the whole the use of nets has been a success. It has sometimes helped to secure a good result, but at other times the fish in a rush seaward have carried nets and all before them." In this way, in the season of 1883, Capt. Adams killed 1200 White Whales.

A considerable decline has taken place in the Bottle-nose fishery; in 1883 eleven vessels were engaged in this fishery, and secured 535 whales; in the past season seventeen vessels captured only 317 fish, which produced 312 tons of oil worth about £12,480. The greatest number taken by one vessel (the 'Maud,' of Dundee) was fifty-six, whereas in the previous season Capt. Gray in the 'Eclipse' alone took 157. One reason for this falling off is that they have been over-fished; but the weather was also very bad indeed, very severe gales from the S.E. and E. almost incessantly prevailed frequently, rendering it impossible to send the boats away for days together. A very painful incident occurred to the boats of the schooner 'Chieftain,' of Dundee, on her first voyage as a whaler. Four of the 'Chieftain's' boats were away on May 26th, one of which with a Bottle-nose in tow succeeded in reaching the ship in safety, but returned to assist the remaining three boats, which were fast to another whale; a fog coming down, they sent the second mate's boat away to find the vessel; the remaining three boats, after waiting some time for her return, cut adrift from the whale and tried in vain for many hours to find the ship. The second mate's boat was eventually picked up by the Norwegian schooner 'Schrieder,' and the crew transferred to their own vessel, the 'Chieftain.' The remaining three boats, in one of which there was a compass, determined to shape their course in company for the nearest point of Iceland, about two hundred miles distant; but on the 27th a severe gale commenced, and the boats were separated; that commanded by the captain eventually reached Iceland all well, as did No. 3, commanded by the spectioneer, one of the crew, however, dying shortly after he landed. Previously to their parting company in the gale, a man from the fourth boat, in charge of Bain the harpooner, was washed overboard, and the others not being able to steer, James McIntosh was transferred from one of the other boats to assist Bain; the young lads in the boat succumbed one after another, till Bain

and McIntosh were left alone. When after three days the storm abated, McIntosh, who had remained at the steering-oar, found Bain dead in the bow of the boat, and fearing that he would not be able to restrain the pangs of hunger, the brave fellow to avoid temptation (a noble example to all future skippers of "Mignonettes") threw his dead comrade overboard, and after drifting about in a helpless and semi-conscious condition was, on the fourteenth day after leaving the ship, picked up by a shark-fishing vessel and conveyed to Iceland, the only survivor of the boat's crew; there both his legs had to be amputated. Happily such disasters are of rare occurrence, and in this instance I fear the result must be attributed to the unsuitableness of the vessel and the inexperience of her crew.

In the pages of 'The Zoologist' for September, October, and November, 1884, will be found a very interesting account by Mr. A. Heneage Cocks, F.Z.S., of the Finwhale fishery on the coast of Finmark, an industry which is assuming considerable importance.

TWO DAYS IN THE COMERAGH MOUNTAINS.

By R. J. USSHER.

On April 30th, 1883, having climbed an exceedingly steep spur, we got at length above the lofty range of cliffs that overlook the eastern half of the County Waterford, and parts of Wexford and Kilkenny. Here was an eyrie where a Peregrine had reared her brood successfully the previous year. It was a shelf of rock beneath an overhanging mass, with a precipice below it. I descended with a rope, but, with the exception of bones left by the birds the year before, and a quantity of London Pride grows plentifully on the Comeragh Mountains, now growing on it, I found it empty. We saw no Peregrines there that day, but three Kestrels, one of which I watched alight at a fissure near the Peregrine's breeding-shelf, and found that two or three hollows had been scratched by these birds in the earth within the fissure. Not far from the Peregrine's eyrie is a "castle" or spur of rock, where in 1882 I found her plucking-place, with feathers of a Corn Crake.

Farther north a tremendous castle or tower of rock projects from the rest of the cliffs. This has evidently been the haunt of

Ravens for many years. Their nest is in a niche beneath an arch of rock. Within this niche (which is of great size) is a pinnacle on which the nest rests. My 150 feet rope took me far enough down to see into it distinctly. It would make a large cartload, and is composed of crooked sticks of furze and ivy, green leaves of the latter adhering. It was rough within and without, and had no lining. Above this, in the same rock-castle, is a great horizontal crevice containing another old Raven's nest or nests (for there are two cavities, evidently of different years, one to the right of the other). This mass is likewise of sticks, and is closely overhung by the rock which shelters it. From hence the Ravens could survey the slopes at the foot of the cliffs and the distant country with its flocks.

We then proceeded over the top of the range (which rises to 2597 feet) to the cliffs over Crotty's Lake, where in May, 1882, I found Peregrines breeding. A long, toilsome walk over soft peat in a fog brought us to our destination. Crotty's Lake lies in a hollow scooped out of the mountain-side by some ancient glacier. At some distance above it rises an amphitheatre of precipices, some of the loftiest in the Co. Waterford, from which the view extends, across the northern part of this county and the Suir-valley, over Kilkenny, Tipperary, and to points beyond.

I ascended with my men by the help of the rope to the lowest ledge we could reach from the top of the cliff, where I placed them above the eyrie, the rope having first been made fast to a pillar stone above, and a second rope of 150 feet being added to the first. I then went round with the rest of the party to the foot of the cliff, and upon a gun being discharged the female Peregrine flew out with her shrill clamour, indicating the spot I sought. Finding that the rope could not be lowered to me, as ledges arrested it, I toiled round the end of the cliffs to my men on the top, and wishing to accomplish my work before dark, I descended on the rope the loftiest cliff I have attempted amid an increasing fog and the shades of evening. Unfortunately in coming down I left the eyrie to my right, my friends failing to direct me, for not until I was passing the eyrie did they discover the white fishing-basket I carried descending from the obscurity above. When once down my men could not lift me again. It now grew dark. The only sound was the shrill "pipe, pipe" of the Ring Ouzel resounding from the rocks near the lake. We

left the rope tied and hanging down the cliff, and after two hours of stumbling among rocks and hollows reached our car at 10 p.m.

On the following morning, May 1st, 1883 (a clear sunny day), after in vain trying to induce our assistants of the previous day to accompany us, I at last got two young men who had accompanied me to Crotty's Lake the previous year, and whom I found helpful intelligent fellows used to the mountains. I sent them on with O'D. to the rope on the top of the cliffs while I went to the foot. Our shouting from above and below did not move the Peregrine, but the moment that I swung the rope she took flight from a horizontal fissure above the smaller oven-shaped cavity where she bred in 1882. (I found on scaling the cliff that this latter recess contains an old Raven's nest, composed, like those visited the previous day, of crooked sticks). The attempt to pull me up from the foot of the cliffs proving fruitless as before, I again climbed round to the men above. Both the Peregrines were now careering about the amphitheatre of cliffs, uttering their rapidly-repeated cry; that of the male was hoarse, while the voice of the female was clear and shrill; she was a truly noble bird, one of the finest I ever saw. I now descended the cliff, coming right down on the eyrie this time, the female Peregrine as I approached her eggs sweeping angrily by with louder cries.

The cliffs of Old Red Sandstone conglomerate are more perpendicular and wall-like here than I have ever seen, but about one-third or one-fourth of the way from the bottom is the horizontal fissure, affording a good grassy shelf that one can stand on comfortably. On the inner side of this shelf, beneath the overhanging rock, a hollow was scraped among the grass; it contained three very round eggs; among them were small bits of stone and of rhizomes of bracken, but, as usual, no nest whatever. I now reached the ground with my hard-won prizes; they were found to be in an early stage of incubation. Were it not for the elevation of this locality, one might expect the young Peregrines to be hatched by the first week in May; but Crotty's Lake is nearly 1400 feet, and the top of the cliff more than 2000 feet above the sea-level. These three eggs measured respectively 2.11 by 1.71 in., 2.05 by 1.63 in., and 1.98 by 1.61 in. One is unusually colourless, another has patches of white showing out through the red, and the third is richly coloured and streaked

with red. On the 23rd I took four eggs of the Peregrine, measuring 2·21 by 1·65 in., 2·17 by 1·72 in., 2·17 by 1·74 in., and 2·1 by 1·72 in.; while two addled eggs of former years in the same eyrie measured 2·14 by 1·69 in. and 2·12 by 1·69 in.

THE MOLLUSCA OF THE COUNTIES OF KENT, SURREY AND MIDDLESEX.

By T. D. A. COCKERELL.

I HAVE been surprised to find that there is no list in existence of the Kentish shells, that Surrey has never been properly worked out, and that even Middlesex might be explored with benefit, nearly every walk producing something new.* I therefore commenced collecting notes on the subject, with a view of publishing a list of which I had myself felt the want, and which I thought, however incomplete, would be better than none. Having accumulated a fair amount of material for the purpose, I have drawn up the following list, which, however, I do not pretend to call complete; indeed it is partly with a view to obtain addenda that it has been written. I have not dealt largely with the question of variation in the present paper, but have confined myself principally to the named forms. I may, however, remark that many varieties of great interest for which I have not found names have been met with in the district. To ensure greater accuracy, most of the species of *Pisidium*, *Odostomia*, *Rissoa*, &c., were submitted to the late Dr.

* The following local lists have been published for these counties:—

KENT.—Smith, "Mollusca of Levendale," Zool. vol. xii. p. 4332, and Benson, Ann. Mag. Nat. Hist. 1856, p. 74; R. H. Smith, "List of Mollusca of Sevenoaks and Faversham," in Cassell's 'Floral Guide to East Kent,' p. 63 (1839); Leslie, "Mollusca of Erith," Quarterly Journ. Conchol. vol. i. p. 33.

SURREY.—Cooper, "Shells at Mickleham," Mag. Zool. & Bot. vol. ii. p. 471; Saunders, 'Mollusca of Reigate,' 2nd ed. 1864.

MIDDLESEX, LONDON AND ENVIRONS.—Cooper, Appendix to 'Flora Metropolitana,' 1836, pp. 120—127; Sheppard, "Mollusca of Fulham," Zool. vol. ix. p. 3120; Gray, Ann. Mag. Nat. Hist. 1856, p. 465; and Harting, 'Rambles in Search of Shells,' published by Van Voorst, post 8vo, pp. 110 (1875).—Ed.

Gwyn Jeffreys, who most kindly named them, while the varieties of the slugs have been named by Mr. W. D. Roebuck, of Leeds.

I have included in the list [in square brackets] several records of interest referring to neighbouring districts.

BRACHIOPODA.

No recent species found. Fossil species of *Terebratula*, *Terebratulina*, *Argiope*, *Crania*, and *Rhynchonella* in the chalk of Kent. *Lingula tenuis* in the London Clay.

CONCHIFERA.

Anomia ephippium.—Margate (T. C.). [Hastings, type, common; v. *aculeata*, only one living specimen (E. Langdon).]

Ostrea edulis and var. *rutupina*.—Dead shells common near Margate; the variety is cultivated at the Reculvers (T. C.). [Hastings, type, common; v. *hippopus*, rare (E. Langdon).]

Avicula, *Lima*, *Spondylus*, and *Inoceramus* occur in the fossil state.

Pecten pusio.—Shellness, near Sandwich (T. C.). [Single valves scarce at Hastings; not uncommon at Brighton (E. L.).]

P. varius.—Common at Margate, &c.; very variable (T. C.). [Hastings (E. L.).]

[*P. opercularis*.—Shellness, &c. (T. C.). [Hastings, type and v. *lineata* (E. L.).]

P. maximus.—One small single valve at Shellness (T. C.). [Very common at Hastings (E. L.).]

[*Lima subauriculata* and *L. hians* v. *tenera*.—One valve of each at Hastings (E. Langdon).]

Modiolaria discors and *M. marmorata*.—Near Margate (S. C. Cockerell). [*M. marmorata*, Hastings (A. W. Langdon in Journ. Conchol.).]

Mytilus edulis.—Margate, Birchington, and Shellness (T. C.); var. *pellucida*, Margate. [Hastings, type and vars. *pellucida* and *incurvata* (E. L.).]

M. modiolus.—Single valves at Shellness (T. C.). [Hastings, rare (E. L.).]

M. barbatus.—Margate, &c. (T. C.). [Hastings (E. L.).]

M. adriaticus.—Shellness (T. C.). [Three dead shells at Hastings (E. L.).]

Nucula nuculeus.—Shellness (T. C.); var. *radiata*, Shellness (S. C. C.). [Hastings, type common; v. *radiata*, scarce (E. L.).]

N. nitida.—Shellness (T. C.). [Hastings (E. L.).]

Leda minuta v. *brevirostris*.—Shellness, single valves (T. C.); one perfect specimen (S. C. C.). [Hastings, 1882 (E. L.).]

Pectunculus glycimeris. Single valves at Shellness (S. C. C.). [Hastings (A. W. Langdon).]

Arca lactea.—Single valves very abundant at Shellness (T. C.). [Single valves rare at Hastings (E. L.).]

[*Lucina borealis*, one valve at Hastings (E. L.).]

Loripes lacteus.—Margate (T. C.). [*Montacuta substriata*, Hastings (E. L.).]

Montacuta bidentata.—Margate, in shell-sand (T. C.).

[*Kellia suborbicularis*, Hastings, rare, living (E. L.).]

Cardium echinatum.—Shellness, &c., single valves (T. C.). [Hastings, living (E. L.).]

C. exiguum.—Margate, single valves common; two perfect shells (T. C.). [Hastings, one valve (E. L.). Near Bognor, single valves (T. C.).]

C. edule.—Margate and Shellness (T. C.); var. *rustica*, St. Nicholas Marsh (T. C.). [Hastings, type and v. *rustica*, dead shells only (E. L.).]

C. norvegicum.—Shellness (T. C.). [Hastings (E. L.).]

Venus verrucosa.—Shellness, single valves, much worn (T. C.). [Hastings (E. L.).]

V. ovata.—Shellness (T. C.). [Hastings (E. L.).]

[*V. exoleta*, scarce; *V. casina*, two living; *V. gallina*, one valve, Hastings (E. Langdon).]

Tapes pullastra and v. *perforans*.—Margate (T. C.). [Hastings, type and var. *perforans* (E. L.). Near Worthing (T. C.).]

T. virgineus.—Ramsgate (J. T. Hillier). [Hastings (E. L.).]

[*T. decussatus*.—Hastings, single valves (E. L.). New Shoreham (T. C.).]

[*Lucinopsis undata*.—Hastings (E. L.).]

Donax vittatus.—Shellness, common; Margate and Birchington, rare (T. C.). [Hastings (E. L.).]

Psammobia vespertina.—A single valve at Shellness (S. C. C.).

Tellina crassa.—Shellness, single valves (T. C.). [Hastings (E. L.).]

T. balthica.—Pegwell Bay, Margate, and Birchington (T. C.). [Hastings (E. L.).]

T. tenuis.—Shellness (T. C.); var. *alba*, Shellness (T. C.). [Hastings (E. L.).]

T. fabula.—Shellness and Margate (T. C.). [Hastings (E. L.).]

T. donacina.—Shellness, one valve (S. C. C.); part of a valve (T. C.).

Syndosmya alba.—Shellness and Margate (T. C.). [Hastings (E. L.).]

S. prismatica.—Shellness (T. C.). [Hastings (E. L.).]

S. tenuis.—Pegwell Bay, abundant (T. C.).

Scrobicularia piperata.—Pegwell Bay and Reculvers (T. C.). [Hastings (E. L.).]

Lutraria elliptica.—Shellness, one valve (S. C. C.). [*L. elliptica* and *L. oblonga*, Hastings (E. L.).]

Mactra solida.—Shellness, with the varieties *truncata* and v. *elliptica* (T. C.). [*M. solida* and v. *elliptica*, single valves, Hastings (E. L.).]

[*M. subtruncata*.—One valve at Hastings (A. W. Langdon).]

M. stultorum.—Margate and Shellness; v. *cinerea*, Shellness (T. C.). [Type and v. *cinerea*, Hastings (E. L.).]

Solen ensis, *S. siliqua* and var. *arcuata*, and *S. vagina*, Shellness (T. C.). [Hastings (E. L.).]

Lyonsia norvegica.—Near Ramsgate (J. T. Hillier).

[*Thracia distorta*.—Hastings, rare (E. L.).]

Corbula gibba.—Shellness (T. C.). [Hastings (E. L.).]

Mya arenaria.—Pegwell Bay (T. C.). Reculvers (S. C. C.).

M. truncata.—Margate, &c. (T. C.).

M. binghami.—Margate (T. C.). [The two last at Hastings (E. L.).]

Saxicava rugosa.—Margate (T. C.). [Hastings (E. L.).]

Pholas dactylus.—Margate; *P. candida*, Shellness, Birchington and Margate; *P. crispata*, single valves only (T. C.). *P. parva*, a perfect specimen (S. C. C.). [All these species of *Pholas* at Hastings (E. L.).]

The genera *Thracia*, *Næra*, *Panopæa*, *Pholadomya*, *Pholadidea*, &c., occur in the fossil state.

Teredo navalis.—Ramsgate (J. T. Hillier); various other localities have been recorded.

[The following have been taken in Sussex:—*T. bipinnata*, *T. malleolus*, *T. excavata*, and *T. cucullata*.]

Cyrena (Corbicula) fluminalis.—Fossil at Crayford with *Pisidium amnicum*, *Sphærium corneum*, *Bythinia tentaculata*, *Valvata piscinalis*, *Planorbis complanatus*, *Limnæa peregra*, *L. truncatula*, &c. (T. C.). The *Corbicula* has now died out in Britain, but the others still survive. I have a recent specimen of *C. consobrina* from Ismailia, given to me by Mr. W. Bendall, which does not appear to be specifically distinct from the Crayford fossil.

Sphærium corneum.—East Kent, Sarre, Herne Bay, &c. (T. C.); West Kent, Mottingham, &c. (T. C.); Surrey, Guildford, Barnes, &c.; Middlesex, Brentford, Regent's Park, &c. [Sussex, Pevensey Marsh; Berks, Reading (W. Holland); Bucks (Selater, *vide* Roebuck); Herts, Watford (Selby), Ware (Jeffreys).]

Var. *flavescens*.—Middlesex, Brentford; Surrey, Croydon Nat. Hist. Club district* (M'Kean); [Herts, Sandridge (W. Griffith).]

Var. *nucleus*.—Middlesex (Rich); Surrey, East Kent (Faversham (J. W. Taylor); [Herts, Watford (Rich, *vide* Rimmer).]

Var. *scaldiana*.—Middlesex; [Herts].

Var. *pisidiodes*.—Middlesex.

S. rivicola.—Middlesex, River Brent, &c.; Surrey, River Wey, near Newark Abbey, near Weybridge, &c. (M'Kean); Sussex, dead shells near Hastings (Jenner).

S. ovale.—Middlesex, Paddington (Gray); Surrey (W. D. Roebuck).

S. lacustre.—East Kent, Minster (S. C. C.); West Kent, Chislehurst; Surrey, Guildford; Middlesex, pond near Wilsdon; [Sussex, Midhurst (T. C.), near Eastbourne and Brighton (Jenner); Bucks (Roebuck); Herts, Ware (J. Gwyn Jeffreys).]

[Var. *brochoniana*.—West Sussex (Jeffrey).]

Var. *ryckholtii*.—Tunbridge (A. H. Cooke).

Pisidium amnicum.—East Kent, rejectamenta of River Stour at Richborough (S. C. C.); West Kent, River Cray (H. Leslie); Surrey, Nutfield (E. Saunders); Middlesex, River Brent; [Sussex, Lewes (Jenner); Hants, Preston Candover (P. Fitzgerald); Berks, Reading (W. Holland); Bucks (W. D. Roebuck); Herts, River Lea (Griffith).]

P. fontinale.—East Kent, Ebbsfleet; West Kent, St. Mary

* This includes the whole of Surrey and the portion of Kent west of the River Darent.

Cray; Croydon Club district (M'Kean); [Sussex, Lewes (J. H. A. Jenner); Herts, Ware (Dr. Jeffreys).]

Var. *pulchella*.—Croydon Club district (M'Kean).

Var. *cinerea*.—Croydon Club district (M'Kean); Middlesex, Northend, near Hampstead (T. C.).

P. pusillum.—West Kent, Bickley and Sidcup; Surrey, Kew, in rejectamenta of Thames (T. C.), Wray Common (E. Saunders); Middlesex, Bedford Park (T. C.), Brentford (Mrs. Skilton); [Sussex, Lewes (Jenner); Hants, Preston Candover (Fitzgerald); Herts, Ware (J. Gwyn Jeffreys).]

Var. *obtusalis*.—Chislehurst Common (T. C.); Surrey, Wray Park (E. Saunders).

P. nitidum.—West Kent, Chislehurst Common (T. C.); [Sussex, Lewes (Jenner); Hants, Preston Candover (Fitzgerald); Herts, Ware (J. Gwyn Jeffreys).]

P. roseum.—Croydon Club district (M'Kean); [Ware (J. G. Jeffreys).]

Unio tumidus.—Middlesex, River Brent (T. C.); Enfield (S. C. C.); Surrey, Basingstoke Canal (M'Kean).

Var. *ovalis* and var. *richii*.—Middlesex.

U. pictorum.—Middlesex, River Brent; Surrey, River Wey, near Guildford (M'Kean).

Var. *radiata*.—Middlesex and Surrey.

[Var. *compressa*.—Ware (Jeffreys); type, Herts and Sussex.]

(*U. margaritifera*.—Specimens liberated in River Wandle, 1875, but probably all died out. Kent, M'Kean).

[*U. littoralis*.—Fossil in Essex, recent in North France. *U. batarus*, North France.]

U. edwardsi and *U. deshayesi*.—Fossil in Woolwich beds.

Anadonta cygnæa.—West Kent, Beckenham; Surrey, Fetcham Common (M'Kean); Middlesex, Regent's Park (S. C. C.); [Sussex, Lewes (Jenner); Bucks (Roebuck); Herts (Jeffreys).]

Var. *incrassata*.—West Kent, Beckenham (S. C. C.).

A. anatina.—East Kent, Minster and Ebbsfleet; West Kent, between Lamberhurst and Paddock Wood; Surrey, stream west of Nutfield Marsh (M'Kean); Middlesex, Regent's Park (T. C.).

Var. *ventricosa*.—River Brent (Mrs. Skilton).

Var. *radiata*.—Croydon Club distr. (M'Kean). [Type, Sussex.]

Dreissena polymorpha.—Middlesex, dead shells in River Brent; Surrey, River Wey (M'Kean).

We have now come to the end of the bivalves: let us pause for a while. In the above list I have given only a few of the localities known to me for the various species, but have tried to select representative ones. Perhaps I have introduced too many localities not belonging to the district in question, but I have done it in the hope of making the list more generally useful. I have touched but lightly on the fossils, because I know but little about them; but I wish some one more experienced than myself would write a list of the fossil shells of the various formations which appear in the district. I will now return to the list.

[PTEROPODA.—*Hyalea tridentata*, one at Hastings (E. Langdon).

SOLENOCONCHIA.

Dentalium tarentinum. — Shellness and Margate. [Hastings (E. L.).]

D. nitens. — London clay, *D. decussatum* and *D. ellipticum*, Gault.

(To be continued.)

HABITS OF THE LIMPET.*

BY J. R. DAVIS.

By far the larger number of Limpets (*Patella vulgata*) “roost” upon rocks whose only covering consists of minute green Algæ and nullipores, together with numerous acorn barnacles. These last are seen to be of very unequal degrees of “cleanness,” some being covered with vegetable growth, others quite white and bare. Those immediately surrounding a limpet or group of limpets are invariably free from Algæ. As might have been anticipated, *Patella* is the cause of this freedom. At low-tide anyone on the look-out can hear a quick, regular, rasping sound in all directions, and see numerous limpets slowly crawling about. Scrutiny of any particular individual shows that the rasping noise is caused by strokes of the radula, which speedily sweeps away the incrusting Algæ. Whilst “on the feed” a limpet moves steadily on, pretty much in a straight line, and continually sweeps its elongated snout from side to side, feeling out probably suitable

* From ‘Nature.’

patches whereon to graze. When such a one is discovered it is gradually licked quite clean. If the patch happens to be the surface of a moderate-sized barnacle, the circular lip is completely spread over it, almost tempting one to believe that the crustacean is about to be "sawn out." Such, however, is not the case, "house-cleaning" being the sole end in view. Indeed, limpets are often serviceable to one another by thus clearing away esculents growing upon their shells. To secure a dinner a good deal of licking is requisite, and perhaps this habit may help to account for the inordinate length of the tongue ribbon. Certainly it must be used up at a very great rate.

But this is not the only, though, I believe, the chief, way in which the limpet feeds. Those individuals which live near large sea-weeds, such as *Fucus*, feed extensively upon them, as their gnawed condition testifies. I can speak confidently in this matter, having caught more than one limpet in the act. The operation was as follows:—The edge of a thick flat part of the thallus was seized by the lip (as a traveller might commence on a colossal sandwich), and being, I suppose, held firmly by the upper jaw, a semicircular "bite" was gradually excavated by successive scrapes of the radula, the edges of the bite being bevelled on the under side. So far as my observation extended, limpets do not feed when covered by water, but always settle down firmly before the rising tide reaches them. The intervals between which any particular limpet feeds seem to be very irregular; but, as a rule, the largest limpets are apparently least fond of long fasts.

In regard to the second point, the locality-sense, great doubt seems to exist in the minds of naturalists as to whether limpets go back to the same place to roost. I believe the question was answered in the affirmative long since by a Mr. King, but, as far as is known to me, he did not publish any details of his observations, and this is my excuse for giving an outline of mine. Following a suggestion of Mr. Murray, I marked a number of limpets with white paint, and made corresponding marks near their "scars" with a view to "keeping my eye on them." As Dr. S. P. Woodward remarks, it seems probable from an *à priori* point of view, that limpets have a settled home, for they occupy scars, often sunk to a considerable depth, which exactly correspond to the outline of the shell. My observations, made

on numerous specimens of various sizes, completely confirm Mr. King's opinion, and the method of marking rendered cases of "mistaken identity" quite out of the question. The greatest distance from its scar at which I noticed a marked limpet to be was about three feet; yet this distance, though extremely rough and covered with barnacles, was re-traversed without difficulty. The excursions from the roosting-places were made in any direction where food offered; so there were nothing like beaten tracks formed. But a limpet always returns home before the rising tide reaches it, and invariably roosts with its snout pointing in the same direction. As might be expected, this direction is only constant for individuals. As the shape of the scar corresponds exactly with the shape of the shell, comfort, of course, could only be gained and a firm hold effected by limpets roosting permanently in the same direction on their scars.

The question now arises, What sense is employed by the limpet in finding its way back to its scar? The appreciation of locality displayed is certainly, for so simply-organised an animal, very keen. The sense of sight is evidently out of court, for an eye like the limpet's, consisting of no more than a sensitive cup, could do little if any more than distinguish between light of different degrees of intensity. The tentacles seemed at first sight to be extremely likely organs to use for the purpose, and to decide this I excised those of two marked individuals which were off their scars. One speedily found its way back; the other seemed confused by the operation for several days, but after that time was found on its scar. This shows a remarkable power of memory, unless the scar was found by accident, which is possible, as the individual was near home when the operation was performed. But even in that case the scar must almost certainly have been *remembered*. Thus the tentacles do not seem to be the means by which home is returned to. The sense of smell then suggested it, and it occurred to me that one reason why limpets kept on their scars when covered by the water was to prevent the "scent" of the track traversed from being washed off. With a view to determine this the space between a wandering limpet and its scar and the scar was carefully washed again and again with sea-water. In spite of this the limpet in question readily found its way back again. Further experiments are, however, needed on this head, for any

ordinary washing would be very ineffective compared with the prolonged soaking the tide would effect in the case of a limpet (like the one just mentioned) living some distance below high-water mark. Still some limpets live so near this last that they are covered but a very short time, and yet these remain on their scars during that time. Hence I think some other motive probably induces them to remain firmly fixed to the scars when under water. Of course they can hold on best when so fixed, and this suggests the most likely reason for the habit, *i.e.*, to avoid being washed off the rocks by the tide. I am inclined to think that the snout plays some part in helping the limpet to get home, as this organ is extremely sensitive, and certainly plays an important part in discovering suitable food. I intend carrying on more extended observations with a view to the more complete elucidation of this puzzling question in regard to the limpet's locality-sense, but this preliminary notice may possibly be of some interest.

[The observations here recorded were made last July at the Scottish Marine Station, Granton, Edinburgh.—Ed.]

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By EDWARD LOVETT.

(Continued from p. 20.)

Homarus vulgaris, Edw.

THE Lobster is certainly the most important and valuable of our crustaceans; it occupies the same proud position in this sub-kingdom as the Oyster does in the Mollusca. Occurring as it does on all our coasts wherever a suitable rocky shore affords it a home, this crustacean is the object of a large and widespread fishing industry, giving employment of a comparatively easy and fairly remunerative kind to thousands of men who draw their living from the deep and their wages from the rugged shore.

The very general favour with which the Lobster is regarded by all classes gives rise to an enormous demand for it; for it is somewhat curious that, whilst we meet with very few indeed who confess that they do not like Lobsters, it is by no means

uncommon, but on the contrary a very usual occurrence, to meet with individuals who could not swallow an Oyster, under even the most toothsome and favourable circumstances.

Considering, therefore, what an important article of food *Homarus* is, although a comparatively expensive luxury withal, it certainly seems a very short-sighted policy that the fishing of lobsters should be carried on in the way it is. Certainly no lobster below a certain regulation size is permitted to be brought ashore under a penalty; but what about the "hen" lobsters with their masses of ripe eggs, or as they are called, "berried" lobsters? I often wonder how many people who are unable to touch "luxuries" would be able to do so if, say, for two or three years no "berried" lobsters were allowed to be caught. What is there to prevent lobsters costing from threepence to a shilling each, when we consider the thousands of square miles of good rocky breeding-grounds on our own shores, to say nothing of the enormous areas on the coasts of Norway and Sweden from whence our markets are largely supplied? It is to be hoped that among the many good results of the great International Fisheries Exhibition of 1883 something will be done in this direction. At present everything is devised and contrived for the purpose of *catching* the food contained in our seas, whilst beyond the praiseworthy efforts of a few with regard to propagating Salmon and Trout, and protecting Oyster and Mussel beds, little has been done to preserve or assist in replenishing the stock of lobsters, which we are doing our best to exterminate, but which by a little judicious legislation and management would prove a still greater source of food to the eater and wage to the fisherman, than it at present is.*

I will now briefly describe the species under consideration, although it is so well known that a description is scarcely necessary. The external skeleton or carapace is hard, solid, and somewhat cylindrical, being, however, in the cephalo-thorax vertically higher than broad, the regions being well marked by a furrow. The rostrum is not very prominent, and is serrated. Antennæ long, with basal spine. The first pair of legs or "claws" are massive (affording a choice morsel when cooked), and unequal; one claw being armed with rounded teeth, whilst

* I shall be glad to see any observations on this subject.

the movable pincer is more finely serrated, as also are the inner edges of the other pincers. This, I fancy, is to enable the Lobster to grasp firmly with the finely-toothed pincers, and to crush with the tuberculated pair. The second and third pairs of legs are armed with small pincers capable of grasping, whilst the fourth and fifth pairs terminate in a simple claw. The swimmerets or abdominal feet are fan-shaped and fringed, and when the groups of ova are attached to the basal joint of these, as they are in separate equally-distributed bunches, the waving to and fro of these fans causes a regular flow of water to circulate freely through them.

The usual colour of this crustacean is blue-black, with the lower edges of the carapace mottled, though many interesting varieties are frequently found. I recently described (Zool., 1884, p. 491) a beautiful variety from Jersey. It was of a delicate pale blue tint, with a peach-like tinge on the cephalo-thorax, the claws being of an intense blue. The specimen, which was a fine one, reached me alive and vigorous. I have also seen a very large and ancient Lobster which was dappled blue and grey; but the most remarkable one I remember was a fine well-grown female of a pale reddish colour, with the antennæ of a decided bright red; this specimen carried a full supply of ripe ova, which I carefully preserved in fluid. It would have been interesting to have known how many of the progeny would have had a tendency to follow the striking peculiarity in colour of the parent.

These specimens I examined living, so that I can vouch for the colours being natural, and not the results of any subsequent accident or treatment. As regards variation from the normal tint, Bell has recorded his opinion that it varies considerably, and that it is possible to tell the locality whence a specimen came by its tint. This may have been the personal experience of that author, but there certainly does not seem to be any hard-and-fast rule by which it can be said that a Jersey Lobster is of one colour and a Welsh Lobster another; for striking varieties do not appear to result from the peculiarities of any one locality, but from surrounding conditions, accidental or otherwise, of which we at present know very little.

I believe that colour varies slightly in accordance with the depth of water and comparative amount of light or shade in which the animals of a particular locality have passed

part of their time, combined perhaps with some change in the kind of food within reach. This question of colour-variation is of some interest, for the boring species of the genera *Axius*, *Gebia*, *Callianassa*, &c., are all of a pale hue, generally in fact of a most unhealthy-looking paleness, owing to the absence of light which these species generally experience during the greater part of their lives. With regard to Mollusca this feature is often very striking. When visiting the large caves in Sark, some years ago, I found some intensely white varieties of the common Dog Whelk, *Purpura lapillus*, in a very dark and sheltered cave, the floor of which was a rock-pool at low tide; whilst outside on the exposed and sun-lit shore the same species was to be found of red, yellow, brown, and blackish tints. I merely mention this to support what I say with regard to the question of habitat in respect to light, which I think is more likely to cause variation than geological or climatic conditions.

Many crustaceans adapt themselves to the pervading tint of surrounding objects, as, for instance, the common Shore Crab, *Carcinus mænas*, which is a dull brown in muddy harbours, yellow when living on a sandy shore, and beautifully mottled with green and white when inhabiting shelly rock-pools amongst *Ulva* and *Zostera*; many others also, being dwellers on sandy bottoms, are yellowish brown, as, for example, the genera *Hyas*, *Inachus*, &c.; or red and brown, as those which live among granite boulders, such as *Xantho* and *Maia*. The lobster, however, does not appear to enjoy such protection, possibly because able to hold its own by other means. It is quite possible when hauling lobster-pots to look over the side of the boat, if in clear still water, and see the lobsters distinctly when other crustaceans and fish are invisible, except when any movement on their part betrays their whereabouts.

The question of lobsters "shooting" their claws is an interesting one, inasmuch as such a performance is unwelcome to the fisherman, spoiling as it does the market value of the Lobster. All crustaceans, or at any rate all the stalk-eyed forms, appear to part readily with limbs under influence of fear or desire to escape, and to be able also to reproduce them during future exuviation and growth; some appear to be much more addicted to this peculiarity than others, for I once captured a specimen of *Xantho rivulosa* which cast the whole of its ten legs

whilst I held it; such an operation as this would of course prove fatal, since the animal would be deprived of any hold whatever.

Curious facts are mentioned by fishermen as to the timidity and loss of claws of Lobsters. It is said that severe thunderstorms often cause them to "shoot" their claws, as also does the discharge of heavy guns. I believe there is a story on record of a dispute between the local authorities of some district and the fishermen, the latter being ultimately coerced into submission by a threat to fire off all the guns at the fort. Now as the fort in question overlooked the lobster-grounds, the effect of such a proceeding was regarded with as much terror by the fishermen as it ultimately would have been by the lobsters themselves had such a threat been carried out; so the men gave way, and the Lobsters saved their claws and continued in a marketable condition for their future captors.

The reproduction of limbs thus lost or injured in fights with each other or their foes—for maimed antennæ, which are quite common, seem to point to such skirmishes—is also of great interest. The wounded part soon hardens over and forms a small bud, in which the future new limb is developed, not in a straight position, but, if a leg, folded, and in the case of antennæ the new member is coiled within the membrane in a spiral form, which of course assumes a straightened position at the next exuviation. I do not see how, after the first moult subsequent to a lost limb, a reproduced member can possibly grow more rapidly than the rest of the carapace; nor do I think it does, but that it always remains in the same proportion to the rest of the limbs as it did when it first threw off the membrane which had formed over the wounded part. I have in my collection a large number of specimens, including many genera and species that have lost limbs and reproduced them, and there is in nearly all a vast difference in size between the old and new members; and in the case of veterans whose "moulting" time has either ceased or else takes place at long intervals there is nothing, I think, to prove that, after the first casting-off of the membrane already referred to, the exuviation of one limb can be carried independently of the rest of the carapace. In this case, therefore, it would be absolutely impossible for a lost limb to be reproduced that would ever attain the size of the one it replaces.

Another curious "anecdote," for I cannot call it a fact,

referred to by Bell as coming from fishermen—and I have heard of the same thing myself—is that old Lobsters have “frequently” been seen with their brood of young ones round them, and, moreover, that such is the love shown by the mother for her young that she warns them of approaching danger by rattling her claws. Now all this is very pretty, but I fear it will not bear investigation. In the first place, considering that crustaceans undergo metamorphosis, as do insects, it would be quite as probable for a butterfly or moth to show maternal love for a swarm of young larvæ or caterpillars as for a “hen” lobster to recognise her young through the larval stages of their existence. But more than this, a lobster is a slow-moving, heavy creature, living on the floor of the sea, whilst its zoea when it emerges from the egg is a minute free-swimming surface-loving atom, millions of which form the regular food of a host of fishes, and a very small percentage of which ever reach the Lobster-stage at all. During this free-swimming period some of the various swarms unite, and probably wander far from their ponderous and unknown parent, and when ultimately the survivors sink to the bottom and commence life in the Lobster-stage, it certainly is most improbable, in fact impossible, that the few survivors of the immense zoea progeny should re-unite and recognise their original parent, or that the parent should recognise what it certainly never saw before, at any rate in the form then arrived at.

The Lobster, as I have already stated, is common on all our shores, and is elsewhere widely distributed. It is usually caught in “pots,” but its fishery is sufficiently well known as to need no description from me. I have a record that, after the great gale and snow-storm of January, 1881, large quantities of lobsters, some weighing eight or nine pounds, were thrown up on the coast near Shoreham for a distance of ten miles.

Though exercising common means of self-preservation, the Lobster is incapable of any discriminating faculty, and, I should imagine, could be caught in any kind of trap properly baited. I remember once watching a fisherman taking lobsters from his pots, when one of them seized the rim of the pot with one of its large claws and held firmly by it. I wondered how the man would make it let go without endangering the claw itself, when I saw him seize the other claw and hold it firmly

closed; he then irritated the mandibles of the lobster, whereupon it immediately let go its hold on the pot to attack the man, and so sacrificed its liberty at once. This I found was the usual way of making lobsters let go their hold, for when seized, they catch hold of anything that comes within range of their claws.

In conclusion, let me say that remarks upon the question of lobsters as an article of food, and also on the subject of colour-variation, would be of much value.

(To be continued.)

NOTES AND QUERIES.

Death of Mr. E. C. Rye.—The announcement of the unexpected death from smallpox, after a very short illness, of Mr. Edward Caldwell Rye, on February 7th, will have been received, we feel sure, by many of our readers with unfeigned regret. Those who enjoyed his friendship will miss the society of a most agreeable, well-informed companion, who was always ready, if asked, to impart the results of his experience or reading; while those for whose benefit he worked, both as a contributor and editor of 'The Zoological Record,' have been deprived of valuable services in a post by no means easy to fill. As a naturalist, Mr. Rye's name will perhaps be best known as the author of an excellent work on 'British Beetles,' published in Lovell Reeve's series, no less than by his connection with 'The Entomologist's Monthly Magazine,' of which he had been for some years part editor. Nor should we leave unnoticed his contributions to 'The Entomologist's Annual,' and to the new edition of 'The Encyclopædia Britannica.' As Librarian to the Geographical Society his services were invaluable, for, in addition to his ordinary duties in that capacity, the task of editing the bibliographical portion of the 'Proceedings' of that Society devolved upon him. For the last seven years he acted as editor of the Travel department of 'The Field,' for which undertaking he displayed an energy and a knowledge of the subject which were remarkable. As a Fellow of the Zoological Society, a Member of the Entomological Society, and Recording Secretary of Section E. at the meetings of the British Association, Mr. Rye had naturally a large circle of friends and acquaintances, whom he has now left to mourn his untimely decease at the comparatively early age of fifty-two.

MAMMALIA.

Polecat in Cornwall.—A Polecat, or "Fitchet-weasel," *Mustela putorius*, has been captured near Madron, about two miles from Penzance. I know the animal well, having often seen it and taken it whilst I was resident on the confines of Dartmoor; but during all the thirty-seven years that I have been resident in West Cornwall I have never until now seen one alive or dead, and this is the more remarkable, seeing that until the last ten years it has not been kept down by any regular preservation of game.—THOMAS CORNISH (Penzance).

Common Rorqual stranded in the Severn.—On the 15th January a large Common Rorqual, "Finner," or "Razorback," *Balanoptera musculus*, Linn., was washed ashore dead at Littleton Pill, on the Severn, about four miles north of the New Passage. The total length of the body was 66 ft. Head about 15 ft. long: upper jaws straight and pointed; lower jaws slightly longer than upper, broad and gaping. The dorsal line showed a regular and very low curve from nose to tail-fork. The pectoral fins were black exteriorly, lanceolate in shape, about 7 ft. long, and placed 21 ft. from the nose. The dorsal fin, which was prominent, erect, and compressed, was placed far back—viz., about 49 ft. from nose and 16 ft. in front of the caudal fork; the fin had a broad attachment to the body and a span of 14 ft. The colour of the body was black above, the belly being white, and in the fresh state considerably tinged with a deep pink. Belly (throat and thorax) traversed by numerous longitudinal grooves lying below and passing behind the pectoral fins. Baleen surrounding upper jaws a little within their outer margin, slate-coloured, with darker streaks outwardly and lighter streaks inwardly,—in short, curved triangular plates, breaking up on inner edges into white bristles, and rapidly diminishing, both in length and breadth, towards the snout. The animal was a female. After lying in the Pill for a few days, during which time it was visited by many thousands of people, the animal was sold by public auction by the agent for the Crown (who claimed the body as "flotsam and jetsam"), to a Bristol artificial manure manufacturer. The purchaser had the animal towed up the River Avon to his works by a steam-tug and horse-power, and having floated it ashore during a high-tide, has been publicly exhibiting it, prior to cutting up the body and preparing the skeleton.—E. WILSON (Bristol Museum).

[The right of the Crown to royal "fish" (the whale and the sturgeon), when stranded or caught near the coast, is mentioned in our oldest books, and is expressly claimed in the statute *De Prerogativa Regis* (17 Edw. 2, c. 11): "Also the king shall have wreck of the sea throughout the realm, whales and great sturgeons taken in the sea or elsewhere within the realm, except in certain places priveleged by the king." Bracton tells us that

when a whale is taken off the coast, it shall be divided between the king and the queen. The king shall have the head, and the queen the tail, in order, say our ancient records, that the queen's wardrobe may be supplied with whalebone. We are not told how much whalebone her Majesty ever succeeded in extracting from a whale's tail.—ED.]

Grey Seal captured near Colchester.—My friend Mr. Southwell has drawn my attention to an account of a Grey Seal, *Halichærus gryphus*, recorded in the 'Annals and Magazine of Natural History' for 1841 (vol. vii.) as having been captured a few years previously to that date near Colchester by some fishermen in their nets. The specimen was of considerable age and blind, and was dissected and presented by the late Professor Clark, father of the present custodian of that institution, to the Cambridge Anatomical Museum, as appears by the Catalogue, 1862, p. 81. As the exact geographical range of animals is now exciting great attention, both Mr. Southwell and myself think the fact of this Seal occurring on the Essex coast of sufficient importance to warrant a re-insertion of the record in 'The Zoologist,' where it will probably come under the notice of a greater number of naturalists than in its present ancient entombment.—HENRY LAVER (Colchester).

BIRDS.

Reported occurrence of the Short-toed Lark in Kent.—Since Mr. Macpherson doubts whether the Short-toed Lark reported by me (p. 31) is a British specimen, it may be as well to state the facts on which my opinion was founded:—*first*, the birdcatcher informs me that he never has, nor has had, any birds from abroad; and the absence of Goldfinches, Bullfinches, and Siskins, as well as of foreign bird-cages, would lead me to believe him; *secondly*, he lives in the neighbourhood of Guy's Hospital, in which poor locality, if he had such birds, he would not be able to sell them; *thirdly*, I think it very unlikely that a poor man would spend five shillings for preserving and casing a bird, on the mere probability of being able, on some future occasion, to deceive a bird collector. That the birdcatcher did not have the Lark preserved with the idea of profit is the more evident since it was in the house of a friend, and was with reluctance sent for. When the bird arrived he showed little inclination to sell it; in fact, he told me that he would not have parted with it a few months before. Should it be supposed that this reluctance was assumed with the idea of obtaining a larger sum, I would remark that I paid very little for it, and would willingly have given double the amount asked. All but two of the Short-toed Larks obtained in England having been trapped by birdcatchers, it seems to me that, in the opinion of Mr. Macpherson, "the authenticity of the specimens amounts at most only to a probability of their being British."—THEO. FISHER (Guy's Hospital).

Ravens in Cumberland.—While staying in Cumberland last spring I determined to try and find a Raven's nest. These noble birds are still not uncommon in the Lake District, but, like the Buzzard, have suffered much from persecution. Forty or fifty years ago there was a certain fixed day upon which the farmers went round to the nests in their neighbourhood and shot the young birds outside them. A reward of I think half-a-crown was given for every Raven's head. Last year, after visiting several well-known breeding-places, I found a nest evidently containing eggs, to judge from the movements of the old birds. Long before we came to the nest the old Ravens circled over our heads, uttering from time to time their hoarse croak. The nest was placed on a ledge of rock about midway down a cliff of 150 ft., and 30 ft. above the nest the rock began to overhang. Having only one man with me I was unable to descend. This was on April 2nd; I came again on the 3rd, with a friend and two men to lower me, and they let me down to within about 15 ft. of the nest. The rock overhung considerably, and, as I had no stick to steady myself, I swung round in the most uncomfortable manner; the guy-rope, which was a new one, having become twisted round the body-rope, caused me to spin round with considerable velocity. The consequence of this twisting was to tighten up the ropes; and when they untwisted, my idea was that the rope was giving way. For what seemed ages to me, I remained twirling in mid-air; at last I was gradually pulled up. I had seen the eggs below me, and determined I would get them, if possible. One of the men was much exhausted, and all three sturdily refused to let me down again that day; they had heard my first call from below, but so faintly that they could not distinguish what I said, and imagined I simply wanted to stop still. On April 5th I came again, with three men to lower and my friend to stand below and signal. The farmer, who lived in the valley, lent me another man and a strong two-pronged alpenstock, wishing me every success. I brought a long fishing-rod with me with a small net at the end made of gauze, like a butterfly-net. Before we arrived at the spot we were joined by another man; I had thus five men to lower me, and my friend to signal below. Being gently lowered, I steadied myself with the alpenstock, and at length got to my old position. Holding the stock firmly in one hand, I managed with the other to get the six eggs into the net, and to ascend again without breaking them. The five men hauled me up in grand style, very different from the laborious exertions on the last occasion. The farmer who owned the valley was delighted, saying that he frequently lost sickly lambs in spring, and that the nest had never been taken before. I subsequently found three Ravens' nests, but did not take any of them, though two were in a much easier place than the one I took. I found a Buzzard's nest on April 1st in an unfinished state. On the 8th inst. the nest was much more finished; I never visited it again, but learned from an old keeper, who used to accompany me in my rambles, that one of the old birds was subsequently shot and the nest

deserted. During my three weeks' stay in Cumberland I frequently saw Buzzards, but regret that this noble bird is becoming scarcer year by year. A word or two about the Heron. This quarry of bygone days may be seen flying over, or fishing, in most of the larger lakes; but their breeding-places are now few and far between. By the Bassenthwaite Lake there is still a heronry of upwards of thirty nests, but many old heronries, as that of Rydal-water, are now forsaken. I am told that there was once a heronry near Buttermere, but that it no longer exists; I noticed several of the birds, however, flying over the lake there. The Woodcock breeds regularly now in Cumberland, and a man told me of a nest close to Derwentwater, but I did not go to see it. The Peregrine is very rare now, and I do not suppose there are more than three nests in the whole Lake District. Snow Buntings are sometimes seen in severe weather. A few Dotterels are generally observed every year, but I do not think a nest has been found for a long time. Lapwings are plentiful on the low ground between Derwentwater and Bassenthwaite Lakes, where Snipe, Teal, and Wild Duck also breed. The Ring Ouzel builds on ledges of the rock, and Rock Doves may frequently be seen darting from the crevices. — R. J. ATTYE (Ingon Grange, Stratford-on-Avon).

Sites of Dippers' Nests.—An instance has come under my notice of a nest placed similarly to those described (Zool. 1884, p. 468; and 1885, p. 25). A careful man, who collects eggs for me, wrote on April 4th as follows:—"I send the nest and eggs of Water Ouzel found April 2nd, 1884, in the upper part of Glenlicky River, on a large rock (boulder) of stone in the centre of the stream. I send this nest, as I considered it different to others in being built so as to resemble a part of the rock in which it was inserted." This nest is composed externally, as usual, of moss interspersed with grass-bents. The back is flat, having evidently been built against a part of the rock, but the top and sides are rounded, having been free. The orifice opens more directly at the side, and is not inclined downwards so much as in other nests built under bridges. Corroborating the attachment of the Dipper to a special site, I may mention that another nest was constructed last March on the inner flange of the iron girder of the railway bridge, similarly placed to that described by me (Zool. 1883, p. 118). The loud noise of trains passing within a few feet of this nest did not disturb the bird. The Dipper appears to me to jerk its tail downwards with a sort of curtsy when slightly alarmed, and never upwards, as shown in some figures of the bird. — R. J. USSHER (Cappagh, Co. Waterford).

Variety of the Greenfinch.—On the 23rd December last I shot a curious variety of the Greenfinch (*Fringilla chloris*), in which the whole of the back and breast were of a pale buff-colour, the under parts being

lighter towards the vent, which was nearly white. I have stuffed it, and propose to set it up with another Greenfinch of the normal colour. — E. J. WHITEHURST (Farnborough Rectory, Wantage).

House Sparrow with rufous breast.—The circumstance of my having received, on June 20th, a number of Sparrows from Holt, in Norfolk, for the purposes of the enquiry carried on for the Norwich Chamber of Agriculture (*cf.* Zool. 1884, p. 428), among which were three cocks with a mixture of strong rufous diffused through the black of the breast and chin, leads me to enquire the meaning of this state of plumage. It is not seasonal, for I have obtained similar Sparrows (of course always cocks) in August and September, as well as at Christmas; and in the late Mr. Dawson Rowley's collection at Brighton there are two such birds labelled as having been procured in February and June. In some of the specimens the abnormal feathers were quite a bright rufous, with a tinge of chestnut extending from the chin downwards. — J. H. GURNEY, JUN. (Northrepps, Norwich).

White's Thrush in Mayo.—A fine specimen of this very rare Thrush (*Turdus varius*, Pallas) has been presented to the Museum of Science and Art, Dublin, by Captain Robert Rutledge-Fair, who informs me that he shot it early in January last (about the 9th) at Westport, Co. Mayo. It was killed "while beating a wood for Woodcock. It rose from thick under-wood and flew much like a Woodcock, for which it was at first mistaken." This is the third specimen of this Thrush which has been procured in Ireland.—A. G. MORE (Science and Art Museum, Dublin).

Red Grouse in Somersetshire and Wiltshire.—The occurrence of a hen Red Grouse at Wrington, in Somersetshire, in September last (Zool. 1885, p. 66) is very remarkable, and possibly may be accounted for by the plenteousness of Grouse in Monmouthshire, the bird in question having probably flown across the Severn from some part of that county. It would be well to know whether it was alone when killed, for, if so, this would bear out my theory. I presume it was killed out of heather. With regard to the Grouse said to have been killed at Wedhampton, in Wiltshire, in 1794 (Montagu, Orn. Dict.), I am rather sceptical. At that time Black-game were fairly plentiful in the New Forest, and I think it most probable that in this instance a grey hen was mistaken for a Red Grouse, a very likely error in those days [the more so as Montagu says he was only shown "a part of the bird."—ED.]. Although a Wiltshire man myself, I do not know Wedhampton; but if at the eastern part of the county, Black-game might easily stray from either Hampshire or across from Surrey, where they then occurred more plentifully than at present. Has the late Mr. Marsh, of Sutton Benger, Wilts, made any mention of this bird? if so, I will say no more, for no one had a more extensive knowledge of the county of Wilts and

its Ornithology. Would that he had left us more notes than those which appeared in 'The Zoologist' five-and-twenty years ago.—E. CAMBRIDGE PHILLIPS (Brecon, S. Wales).

Ornithological Notes from the Isle of Wight.—Early in November last a Stone Curlew was procured; though not a common bird with us, it is occasionally met with in winter. Swallows and Martins were observed in the Undercliff till the first week in November, but they had all left Malvern by October 9th; they had been observed to resort to some lofty elms to roost. A Ringed Guillemot, a male, was shot off Ventnor early in January: a rare species on this coast, not more than three or four instances of its capture being recorded. This bird is in a transition state of plumage, more white than black on one side of the head, with which the bridle is blended; but on the reverse side of the head and neck it is well defined, so is the white encircling the eye. A bird has been observed of late (though not distinctly) skulking among the garden shrubs—the Whitethroat, I believe. The winter has been a mild one in the Undercliff: thermometer down to 32° twice only during the day, *viz.*, on January 13th and 14th,—HENRY HADFIELD (High Cliff, Ventnor).

Early Nesting of the Long-eared Owl.—On dissecting a female Long-eared Owl, sent for preservation on February 10th, I was surprised to find it showed signs of having recently laid and incubated. I found the ovary contained two eggs about ready for exclusion, besides others which were large, but not too far advanced. From these facts I conclude that the bird laid its first egg about February 3rd, and, as this species continues laying and sitting the whole season, the male taking part in the incubation, I think it is a very early commencement.—H. BARBER (Lincoln).

Heron preying on Field-mice.—As a proof that "all is fish that comes to the net" of the Heron, my brother-in-law writes me this morning (February 18th) that, having lately killed a Heron, it disgorged, on being picked up, four field-mice. I have known of rats having been thrown up, and in one case a Water Rail; but field-mice appear to me as somewhat unusual food.—E. CAMBRIDGE PHILLIPS (Brecon, S. Wales).

Interbreeding of the Thrush and Blackbird.—I was under the impression that this subject had been well-nigh exhausted, but, as Mr. Christy has quoted another case, let me just say that I perfectly agree with him that a female Blackbird was in this instance mistaken for a Thrush. Should any more instances be brought forward, let me ask that the length of tail of the supposed hybrid be accurately described, as without this—to my mind—distinguishing mark (the shorter tail of the Thrush being plainly discernible) I for one shall still adhere to my total disbelief in wild-bred hybrids, more especially those between the Thrush and Blackbird.—E. CAMBRIDGE PHILLIPS (Brecon, S. Wales).

Solitary Sandpiper in Cornwall.—A second specimen of the Solitary Tatler, *Totanus solitarius*, Wilson, has been killed on the marsh near Marazion. I noted the first from Scilly in 'The Zoologist' for 1882, p. 432. The present specimen was identified by Mr. W. H. Vingoe, in whose hands it now is (Jan. 26th), and, having examined it, I find it to be certainly a bird of the same species as that shot at Scilly in 1882.—THOS. CORNISH (Penzance).

The American Killdeer Plover in Cornwall.—A specimen of the American Killdeer Plover, *Ægialitis vociferus*, has been obtained by Mr. Jenkinson at Tresco, in the islands of Scilly. It attracted his attention by its peculiar cry. On sending it to Mr. Vingoe, who has set it up, Mr. Jenkinson telegraphed (Jan. 15) that he had "shot a large Ringed Plover with ash-coloured legs, tail-coverts chestnut-coloured, and tail very long." I have compared the specimen with Bonaparte and Wilson's figure of the bird, and it corresponds in every particular with it, except that in the coloured figure the back is more rufous than it is in the actual specimen. It is perhaps of more importance that the specimen corresponds in every point with Wilson's description of the Killdeer Plover.—THOMAS CORNISH (Penzance).

Cream-coloured Courser in Cornwall.—A specimen of the Cream-coloured Courser, *Cursorius gallicus*, has been procured by Mr. W. H. Vingoe, from Mawgan, near St. Columb, where it was taken in December last.—THOMAS CORNISH (Penzance).

An unobserved Habit in Long-tailed Tit.—When rabbit shooting the other day, and standing under some alder trees which overhang the lake here, the water being some three feet deep under them, I saw a troop of these interesting little birds, and watched them till they came into the trees close to me. They were, as usual, very busy searching the branches over for food; suddenly one dashed into the water and up in a second on to a branch, two more doing the same. It struck me they were picking up some food that had dropped on the water; but, as the habit was quite new to me, I watched with renewed interest. One or two more first flew down and touched the water, and then flew up; presently one flew out about six yards from the trees and dashed quite into the water, and, when he settled again, he shook his feathers out with great vigour, and seemed to have enjoyed his plunge immensely. I need hardly say how very interested I was, for both the picking food off deep water and bathing were quite new to me.—J. WHITAKER (Rainworth Lodge, Notts).

Reported Occurrence of the Blue-winged Teal near Redcar.—In 'The Zoologist' for 1882 (p. 92) I referred to a supposed specimen of the American Blue-winged Teal, *Querquedula discors*, shot on September 3rd
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in that year, in Cowpen Marsh, near Redcar. The bird has since proved to be a young male Garganey, *Querquedula circia*, and I am therefore desirous of correcting my former statement in regard to it.—T. H. NELSON (North Bondgate, Bishop Auckland).

Note on *Machæramphus alcinus*.—The information given by Mr. Pryer (*supra*, pp. 47, 48) as to the bat-eating propensities of *Haliastur indus* (or rather *H. intermedius*) and of *Machæramphus alcinus* is highly interesting, and, with regard to the last-named species, I wish to point out that its near ally, *M. anderssoni*, of Madagascar and South Africa, is also a bat-eater, as recorded by Andersson in his 'Notes on the Birds of Damara Land,' p. 24.—J. H. GURNEY (Northrepps Hall, Norwich).

[We may remind our readers that the common Hobby has been known to prey on Bats.—See 'Zoologist,' 1877, p. 472.—ED.]

Marsh Harrier in Dumbartonshire.—A young male specimen of the Marsh Harrier, *Circus aruginosus* (Linn.), was taken by a gamekeeper in a trap at Caldarvan, Dumbartonshire, on July 2nd, 1883. It had been observed for some days before flying about in the neighbourhood of a small loch, near which it was taken. Total length, $19\frac{1}{2}$ inches; spread of wings, 48 inches. The birdstuffer who preserved the bird reported the stomach to be empty. The Marsh Harrier is now a rare bird in any part of Scotland, and very few specimens have of late years been recorded from any of the western counties. So far as I am aware, there is no authentic instance of the species ever having before occurred in the county of Dumbarton. It is included—under the name of Moor Buzzard—in the list of the birds of the parish of Luss by the Rev. Mr. Stewart ('Statistical Account of Scotland,' published 1796); but, although this gentleman was a good naturalist, we fear some of the species in his list must be accepted with care. — JAMES LUMSDEN (Arden, Dumbartonshire).

FISHES.

Food of Cod.—I have found in the stomach of a Cod the partly-digested remains of a common Squid, *Loligo vulgaris*. There is nothing at all remarkable about this beyond the fact that the Cuttle was perfect, with the exception of its sac or outer covering. It is curious that this should have first yielded to the gastric juice of the fish.—THOS. CORNISH (Penzance).

MOLLUSCA.

The Band-marking of *Helix hortensis*.—It may sometimes be observed that in specimens of *H. hortensis*, which were, when in good condition, bandless, that on the shell becoming weathered, there are tracts corresponding to the position of the bands of other shells, which become eroded and the epidermis destroyed more rapidly than other parts; thus

we occasionally see whitish bands (usually the 2nd and 3rd) on old shells caused in this way, because the locality of the bands, even when these are absent, is thinner and more easily destroyed than other parts of the shell. This phenomenon I have as yet only witnessed in the bandless forms of the varieties *lutea* and *lilacina*, but I doubt not that it occurs in other varieties as well. Another way of demonstrating the bands in an apparently bandless specimen is to put it into dilute hydrochloric acid. In this way I have produced somewhat transparent bands (No. 3 notably) in a specimen of var. *lutea* which before being so treated showed no traces of bands. I have not noticed that *H. nemoralis* is ever eroded in the same way, and I quite failed to get any marked traces of bands with hydrochloric acid.—T. D. A. COCKERELL.

Planorbis glaber in Surrey.—Towards the end of my paper on Surrey Mollusca I said that I expected that *P. glaber* would be found in Surrey, and it would seem that these expectations have been already realised, for two broken shells which I found in the rejectamenta of the Thames at Kew, on December 29th, have been named by Mr. W. D. Roebuck, the Recorder of the Conchological Society, as *P. glaber*. The Paddock Wood specimens, however, he considers a variety of *P. albus*. — T. D. A. COCKERELL (51, Woodstock Road, Bedford Park, Chiswick).

CRUSTACEA.

Ebalia cranchii at Penzance.—I send by post herewith two specimens of *Ebalia cranchii*. They were dredged in our bay on a fishing-ground known to us as the "White Houses," about two or three miles due south of our pier-head, and having a shingly bottom. Several other specimens were secured at the same time. I suspect that the presence of this crab in large numbers is due to the existence of some unknown law of Nature which occasionally causes little crabs of certain species to shoal. I have noticed it of *Portunus arcuatus* once, and of *Corystes cassivelaunus* many times.—THOMAS CORNISH (Penzance).

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

February 5, 1885.—FRANK CRISP, LL.B., Vice-President & Treasurer, in the chair.

The Rev. L. Klein, B.Sc., was elected a Fellow of the Society.

A paper was read "On the *Arbaciida*, Gray" (Part I., the Morphology of the Test in the Genera *Calopleurus* and *Arbacia*), by Prof. P. Martin

Duncan and W. Percy Sladen. The recent and fossil species of *Calopleurus* and the recent forms of *Arbacia* examined, present some structural details of both primary and secondary classificatory importance which have been hitherto neglected and unrecorded. The ambulacral plates differ from those of all other *Echinoidea* in the arrangement of the triplets, there being a central primary plate with an adoral and an aboral demi-plate, while there are no additional plates near the peristome in the species of *Arbacia*. The structure of the sutures, especially of the median inter-radials, is a modification of the dowelling which has been described in *Temnopleurus* by one of the authors. The double optic pore noticed by Lovén occurs in the fossil species of *Calopleurus* and in *C. Maillardi*, a recent species. The authors compare the different forms, and exclude *Arbacia nigra* from the genus *Arbacia*. The next part will deal with the classification.

Mr. W. F. Kirby read a paper "On the employment of the names proposed for Genera of Orthoptera previously to 1840." The author shows the application of every name proposed from the time of Linné to the publication of Serville's 'Histoire Naturelle des Insectes Orthoptères,' and appends a bibliography.

February 19.—Prof. P. Martin Duncan, F.R.S., Vice-President, in the chair.

The Rev. L. Martial Klein, D Sc., of St. Asaph, was elected a Fellow.

Mr. Thos. Christy exhibited some samples of excellent silk from Auckland, New Zealand, but the insect which had spun them was not identified.

The substance of Part III. of the Rev. A. Eaton's Monograph on the Mayflies (*Ephemeridæ*) was read by the Secretary. In this the fourth series of Group 2 of the genera are dealt with. Among miscellaneous representatives of the genera, adult and in good condition, *Cloëon* is easily distinguished by the absence of hind wings; *Callibates* by the large rounded costal projection and numerous cross veinlets of its broad, oblong, obtuse hind wings; *Batis* by hind wings as broad and obtuse as those of the preceding genus, but with the costal projection, if any, small and acute, and with scarcely a cross veinlet at all; *Centroptilum* by the extreme narrowness of its very small hind wings, and usually by the slenderness of their costal projection. The distinctive characteristics of Sections 10 and 11 of the genera are also taken into consideration, and full descriptions of many new species are given.

A paper was read by Prof. P. Martin Duncan, "On the Anatomy of the Ambulacra of the recent *Diadematidæ*." The author described the arrangement of the compound plates of the genera *Diadema*, *Echinothrix*, *Centrostephanus*, *Astropyga*, *Micropyga*, and *Aspidodiadema*. The first

three genera have triplets consisting of primaries, the dorsal and arboral plates being low and broad, and the second, or central plate, being a large primary. Near the peristome there is deformity of this typical arrangement, and in *Echinothrix* a demi-plate may enter, but it is never the second plate. In *Astropyga* the triplets are arranged so that the majority are on the *Diadema*-type, the exceptions being recorded. The structure of the triplets of *Micropyga* is unique, and the arrangement, leaving out the position of the pores, is somewhat like that of *Calopteurus*. *Aspidodiadema*, as has been explained by A. Agassiz, is like *Cidaris* in its ambulacra.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

February 3, 1885.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary exhibited a specimen of a rare South-American Lizard, *Heterodactylus imbricatus*, presented to the Society by Mr. G. Lennon Hunt; and a specimen of a rare beetle, *Julodis Ffinchi*, of the family *Buprestidæ*, from Beloochistan.

A letter was read from Dr. George Bennett, of Sydney, containing remarks on the Tree-Kangaroo of Queensland, *Dendrolagus Lumholtzi*, lately described in the Society's 'Proceedings.'

A series of specimens of lepidopterous insects, which had been bred in the Insect House in the Society's Gardens during the past season, was laid on the table.

A communication was read from M. Taczanowski and Count Berlepsch containing an account of the third collection of birds obtained by M. Stolzmann in Ecuador. The collection contained examples of 289 species, of which ten were new to Science.

Lieut.-Col. C. Swinhoe read the first of a series of papers on the Lepidoptera of Bombay and the Deccan. The present communication contained an account of the Rhopalocera, and gave the results of two years' daily collecting.

A communication was read from Mr. Robert Collett, giving an account of *Echidna acanthion*, a new species of Spiny Anteater lately discovered in Northern Queensland.

A communication was read from M. Jean Stolzmann, containing the description of a new Rodent, belonging to the genus *Calogenys*, from Ecuador, proposed to be called *Calogenys Taczanowskii*.

February 17, 1885.—OSBERT SALVIN, Esq., F.R.S., Vice-President, in the chair.

A report was read on the additions that had been made to the Society's Menagerie during the month of January, and special attention was called

to a Black-and-Yellow Hawfinch, *Mycerobus melanoxanthus*, from Northern India; an Andaman Starling, *Sturnia andamanensis*, from the Andaman Islands, new to the Society's collection; and a young male European Moose, *Alces machlis*, presented by Mr. Evelyn Hubbard.

Mr. F. E. Beddard read a paper upon the structure of the Cuckoos (*Cuculidæ*), and pointed out the differences in the pterylosis and the structure of the syrinx in the various forms which he had examined. It was proposed to divide the family into three subfamilies—*Cuculina*, *Phenicophaina*, and *Centropodina*.

Mr. F. E. Beddard read a paper upon the heart of *Apteryx*, and called attention to the variations in the condition of the right auriculo-ventricular valve observed in different individuals of this bird.

A communication was read from Mr. M. Jacoby, containing the first part of an account of the Phytophagous Coleoptera obtained by Mr. George Lewis during his second journey in Japan, from February, 1880, to September, 1881.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

Annual Meeting, Januagr 21, 1885.—J. W. DUNNING, Esq., M.A., F.L.S., &c., President, in the chair.

An abstract of the Treasurer's accounts for 1884 was read by Mr. H. T. Stainton, one of the Auditors.

The Secretary then read the Report of the Council for 1884.

The Secretaries not having received any notice proposing to substitute other names than those in the lists prepared by the Council, the following Members form the Council for 1885:—T. R. Billups, H. Druce, J. W. Dunning, E. A. Fitch, H. Goss, F. Grut, W. F. Kirby, R. M'Lachlan, R. Meldola, E. Saunders, J. W. Slater, S. Stevens, and J. J. Weir.

The following are the officers elected:—*President*, R. M'Lachlan, F.R.S.; *Treasurer*, E. Saunders, F.L.S.; *Secretaries*, E. A. Fitch, F.L.S., and W. F. Kirby; *Librarian*, F. Grut, F.L.S.

The President then delivered an address, at the conclusion of which Mr. H. T. Stainton proposed a cordial vote of thanks to Mr. Dunning for his services as President during the year, and requested that he would allow his address to be printed with the 'Proceedings.' The proposal was seconded by Jonkheer May, and carried unanimously. The President returned thanks.

Mr. M'Lachlan proposed a vote of thanks to the Treasurer, Secretaries, and Librarian, which was seconded by Mr. Waterhouse, and carried unanimously.

Messrs. Saunders, Fitch, Kirby and Grut made some remarks in acknowledgment.

February 4, 1885.—R. M'LACHLAN, Esq., F.R.S., &c., President, in the chair.

Mr. M'Lachlan returned thanks to the members for his election to the office of President, and nominated Messrs. Dunning, Stevens and Weir as Vice-Presidents for the ensuing year.

H. B. James, Esq. (Valparaiso) and Thomas Collett Sandars, Esq (46, Cleveland Square, Hyde Park, W.), were balloted for and elected Members of the Society.

Mr. J. W. Slater exhibited a specimen of *Polyommatus chryseis*, Hüb., captured on Cultor Moor, Aberdeenshire, in July, 1878, by Mr. James Mutch. The occurrence had not been previously recorded, as the captor was not aware of the rarity of the species; two other specimens were seen in the same locality.

Capt. H. J. Elwes said the specimen greatly resembled the boreal form *P. Stieberi*, Gerh., which is uncommon in Lapland, and this fact tended to confirm the genuineness of the capture. Messrs. Stainton and Weir also made some remarks on the exhibit.

Rev. A. Fuller exhibited a collection of insects, particularly rich in Lepidoptera, captured along the line of the Canadian Pacific Railway during his visit to the Rocky Mountains after last year's meeting of the British Association at Montreal.

Mr. W. Cole exhibited a wasp's nest from Woodford Bridge, Essex, from which he had extracted specimens of *Vespa norvegica*, Fabr., and stated that Master Chapman, the finder of the nest, had captured specimens of *Vespa sylvestris*, Scop., issuing from the nest.

Mr. E. Saunders stated that he had examined the specimens, and the circumstance of the two species occurring in one nest was very curious; they both belonged to the same section, and were not structurally distinct, except in the genitalia of the males; still the species differed much in size, colour, and pubescence.

Mr. W. L. Distant exhibited, on behalf of Mr. L. de Nicéville, of Calcutta, a series of wings of butterflies, illustrative of seasonal variation in Indian Rhopalocera collected in Calcutta. The point to be discovered is, as M. de Nicéville wrote to him, why "the ocellated forms should occur in the rains and the non-ocellated ones in the dry weather?"

Capt. Elwes made some extended remarks upon the subject of seasonal dimorphism and geographical forms, saying that Mr. Fuller's exhibits reminded him of one of the most interesting facts connected with geographical distribution, as many of the varieties in his collection made on the line of the Canadian Pacific occurred again over 500 miles south in the mountains of Colorado, and at no intermediate stations.

The President also remarked on the importance of M. de Nicéville's exhibition and discoveries of the temperature forms of various *Satyridæ*,

and hoped that this would serve as a warning to museum naturalists, as he firmly believed that a vast majority of the new species now being made on very slender characters would prove to be casual varieties or seasonal forms of one and the same species. In his younger days he well remembered how two or three distinct forms of our common white butterflies (*Pieris*) were recognised as good, but now exploded, species, and they were possessed of characters far more important than those now used to distinguish species by certain entomologists.

Mr. E. A. Butler exhibited the egg-sacs of three species of *Mantidæ* from Molepolole, Bechuanaland. One species was indicated by egg-cases exactly resembling, though rather smaller than, those figured at Proc. Ent. Soc. Lond., 1883, p. xxxv, and his correspondent had sent them as without doubt belonging to a certain Mantis.

Mr. W. F. Kirby, on behalf of Herr Buchecker, who was present as a visitor, exhibited three volumes of drawings of Hymenoptera.

Mr. Stainton exhibited bred specimens of *Chauliiodus insecurellus*, Sta., which he had received through Mons. A. Constant from Gascony. The larva of this insect had at last been found, not on one of the *Umbelliferae*, but on one of the *Santalaceæ*, *Thesium divaricatum*. No doubt in this country the larva would be found on *Thesium humifusum*, a plant which, according to Brewer's 'Flora of Surrey,' occurred on Banstead Downs. Unfortunately it is a somewhat inconspicuous plant, with which few entomologists were acquainted. It would now be their mission to learn to recognise this plant, known in England as "bastard toad-flax," and to find the larva of *C. insecurellus* upon it.

Mr. T. R. Billups exhibited two females of *Ranatra linearis*, Linn., captured at Loughton, Essex, on January 16th last, in a locality where there was probably no water within a mile.

Mr. E. P. Collett did not think the *Ranatra* was so rare as was generally supposed; he had captured as many as sixty specimens in one day.

Mr. Billups also exhibited a box containing Ichneumonidæ and Hemiptera, captured at Headley Lane on January 3rd, 1885.

The Secretary read a letter from Mr. A. Lloyd, requesting the Society to give an opinion to assist him, as Hon. Sec. of the West Sussex Natural History Society, in recommending the best system of arrangement and nomenclature to adopt for British Lepidoptera.

Mr. G. F. Mathew contributed the "Life-history of three species of Western Pacific Rhopalocera." *Papilio Schmeltzi*, H.-S., *P. Godeffroyi*, Semp., and *Xois Sesara*, Hew., were the species treated of.

Mr. George Lewis contributed a memoir, "On a new genus of *Histeridæ*." A very abnormal genus, previously referred to as probably belonging to the *Synteliidæ*, was described under the name *Nimponius*, and four new species were described from Japan.—E. A. FITCH, Hon. Sec.

